

CLAIMS

1. A method of delivering frozen products comprising:

storing frozen products requiring cold insulation in a
5 cold-insulating container structured of a vacuum heat-insulating
material; and

loading the cold-insulating container in one of a
refrigerator vehicle, cold-insulating vehicle, and room-temperature
vehicle other than a freezer vehicle for delivery.

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2. The method of delivering frozen products of claim 1, wherein
the vacuum heat-insulating material is structured so that a core
material made by compression-molding a fiber material is covered
with a gas-barrier jacket material, and an inside covered with the
15 jacket material is depressurized for vacuum encapsulation.

3. The method of delivering frozen products of one of claims 1
and 2, wherein the vacuum heat-insulating material has a thickness
ranging from 2 to 20 mm inclusive.

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4. The method of delivering frozen products of any one of claims
1 through 3, wherein the vacuum heat-insulating material has an
initial thermal conductivity up to 0.01 W/mK.

25 5. The method of delivering frozen products of any one of claims
1 through 4, wherein the cold-insulating container is capable of
housing frozen products at least at a predetermined percentage with
respect to an internal capacity thereof, and maintaining an inside

temperature thereof up to 0 °C at least for two hours.

6. The method of delivering frozen products of any one of claims 1 through 5, wherein a cold-storage agent is housed in the cold-insulating container in an amount according to time taken for delivery.

7. The method of delivering frozen products of any one of claims 1 through 6, wherein a cold-storage agent having a melting point ranging from -27 to -18 °C inclusive is housed in the cold-insulating container.

8. The method of delivering frozen products of any one of claims 1 through 7, wherein the cold-insulating container is capable of housing at least 1kg of the cold storage agent per internal capacity of 50 l, and maintaining an average inside temperature up to 0 °C for at least 10 hours.

9. The method of delivering frozen products of any one of claims 1 through 8, wherein the cold-insulating container has an internal capacity of at least 70 l.

10. The method of delivering frozen products of any one of claims 1 through 9, wherein a protective case for housing the cold-insulating container is provided, and the frozen products are delivered while the cold-insulating container is housed in the protective case.

11. The method of delivering frozen products of any one of claims 1 through 10, wherein

the cold-insulating container includes:

four peripheral walls;

5 a bottom face ;and

an openable and closable lid;

each of the members is formed of a sheet material enveloping a planar vacuum heat-insulating material therein; and

10 the cold-insulating container is collapsible with the respective members forming a box in use, and the respective members overlapping with one another not in use.

12. The method of delivering frozen products of any one of claims 1 through 10, wherein

15 the cold-insulating container includes:

four peripheral walls connected into a square shape so as to be foldable one another;

two lids connected to two opposed ones of the peripheral walls along upper side edges thereof so as to be foldable;

20 and

two bottom faces that are connected to the two peripheral walls connected to the lids, along lower side edges thereof, so as to be foldable; and

25 each of the peripheral walls, lids, and bottom faces is formed of a sheet material enveloping a planar vacuum heat-insulating material therein; and in each of two peripheral walls adjacent to the peripheral walls connected to the lids and bottom faces, the vacuum heat-insulating material is divided along a folding line

extending in a direction of a height thereof in substantially a central part so as to be foldable; and

the container has a collapsible structure, wherein, in use, the two lids and bottom faces are turned into a closed position for engagement to form a box, and not in use, engagement of the lids and bottom faces is released, the bottom faces are folded inwardly or outwardly of the peripheral walls, the lids are folded in a direction opposite to that of the bottom faces and, while the foldable peripheral walls are folded inwardly along the folding lines, the adjacent peripheral walls are brought closer to each other so that the lids, peripheral walls, and bottom faces overlap with one another.

13. The method of delivering frozen products of claim 12, wherein

the cold-insulating container includes:

on one of the lids, an engaging flap including a flexible hook-and-loop fastener along a side edge thereof engaging with an other lid; and

on the other lid, a hook-and-loop fastener in a portion corresponding with the engaging flap; and

turning the two lids into a closed position matches the side edges of both lids and brings the engaging flap on the one lid into contact with the other lid to engage both hook-and-loop fasteners each other.

14. The method of delivering frozen products of any one of claims 12 and 13, wherein

the cold-insulating container includes:

on each of the two foldable peripheral walls, a flexible engaging flap including a hook-and-loop fastener along an upper side edge thereof so that the flap is urged upwardly rather than laterally; and

5 on each of the two lids, a hook-and-loop fastener corresponding with the hook-and-loop fastener on the engaging flap; and

when the two lids are turned into a closed position, the lids depress the engaging flaps inwardly and make contact therewith
10 so that the hook-and-loop fasteners and corresponding ones engage with each other.

15. The method of delivering frozen products of any one of claims 12 through 14, wherein

15 when the cold-insulating container is collapsed, the bottom faces are folded inwardly of the peripheral walls and the lids are folded outwardly of the peripheral walls; and

in use, a flexible bottom sheet for covering an entire external surface of the two bottom faces is attached along lower side
20 edges of the four peripheral walls.

16. A collapsible cold-insulating container comprising:

four peripheral walls;

a bottom face; and

25 an openable and closable lid,

wherein each of the members is formed of a sheet material enveloping a planar vacuum heat-insulating material therein, and the cold-insulating container is collapsible with the respective members

forming a box in use, and the respective members overlapping with one another not in use.

17. A collapsible cold-insulating container comprising:

5 four peripheral walls connected into a square shape so as to be foldable one another;

 two lids connected to two opposed ones of the peripheral walls along upper side edges thereof so as to be foldable; and

 two bottom faces that are connected to the two peripheral
10 walls connected to the lids, along the lower side edges thereof, so as to be foldable;

 wherein each of the peripheral walls, lids, and bottom faces is formed of a sheet material enveloping a planar vacuum heat-insulating material therein, and in each of the two peripheral
15 walls adjacent to the peripheral walls connected to the lids and bottom faces, the vacuum heat-insulating material is divided along a folding line extending in a direction of a height thereof in substantially a central part, so as to be foldable; and

 the container has a collapsible structure, wherein, in
20 use, the two lids and bottom faces are turned into a closed position for engagement to form a box, and not in use, engagement of the lids and bottom faces is released, the bottom faces are folded inwardly or outwardly of the peripheral walls, and the lids are folded in a direction opposite to that of the bottom faces, and while the foldable peripheral
25 walls are folded inwardly along the folding lines, the adjacent peripheral walls are brought closer to each other so that the lids, peripheral walls, and bottom faces overlap with one another.

18. The collapsible cold-insulating container of claim 17 including:

on one of the lids, an engaging flap including a flexible hook-and-loop fastener along a side edge thereof engaging with an
5 other lid; and

on the other lid, a hook-and-loop fastener in a portion corresponding with the engaging flap,

wherein turning the two lids into a closed position matches side edges of both lids and brings the engaging flap on the one lid into
10 contact with the other lid to engage both hook-and-loop fasteners each other.

19. The collapsible cold-insulating container of any one of claims 17 and 18, including:

15 on each of the two foldable peripheral walls, a flexible engaging flap including a hook-and-loop fastener along an upper side edge thereof so that the engaging flap is urged upwardly rather than laterally; and

on each of the two lids, a hook-and-loop fastener
20 corresponding with the hook-and-loop fastener on the engaging flap,

wherein, when the two lids are turned into a closed position, the lids depress the engaging flaps and make contact therewith so that the hook-and-loop fasteners and corresponding ones engage with each other.

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20. A collapsible cold-insulating container of any one of claims 17 through 19, wherein

when the cold-insulating container is collapsed, the

bottom faces are folded inwardly of the peripheral walls and the lids are folded outwardly of the peripheral walls; and

in use, a flexible bottom sheet for covering an entire external surface of the two bottom faces is attached along lower side edges of the four peripheral walls.

21. The collapsible cold-insulating container of anyone of claims 16 through 20, wherein the vacuum heat-insulating material is structured so that a core material made by compression-molding a fiber material is covered with a gas-barrier jacket material, and an inside covered with the jacket material is depressurized for vacuum encapsulation.

22. The collapsible cold-insulating container of any one of claims 16 through 21, wherein the vacuum heat-insulating material has a thickness ranging from 2 to 20 mm inclusive.

23. The collapsible cold-insulating container of any one of claims 16 through 22, wherein the vacuum heat-insulating material has an initial thermal conductivity up to 0.01 W/mK.

24. The collapsible cold-insulating container of any one of claims 16 through 23, wherein a cold-storage agent having a melting point ranging from -27 to -18 °C inclusive is housed inside thereof.

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25. The collapsible cold-insulating container of claim 24, wherein the cold-insulating container is capable of housing at least 1kg of the cold storage agent per internal capacity of 50 l, and

maintaining an average inside temperature up to 0 °C for at least 10 hours.

26. The collapsible cold-insulating container of any one of claims
5 16 through 25, wherein the cold-insulating container has an internal capacity of at least 70 l.

27. The collapsible cold-insulating container of any one of claims
16 through 25, wherein at least one of the sheet material, the
10 engaging flaps, and the bottom face sheet is made of a waterproof cloth.

28. The collapsible cold-insulating container of any one of claims
16 through 27, wherein additional strengthening is provided on at
15 least one face facing to an outside in use or not in use, among faces of the peripheral walls, lids, and bottom faces.

29. The collapsible cold-insulating container of any one of claims
16 through 28, including a cold-storage agent holder for holding the
20 cold-storage agent therein on an inner surface of at least one of the lids, peripheral walls, and bottom faces.

30. The collapsible cold-insulating container of any one of claims
16 through 28, including a flexible inner cover inside of the lids,
25 wherein the inner cover is attached along an upper side edge of one of the peripheral walls connected to one of the lids, and the inner cover is not smaller than a length from the upper side edge to a bottom edge of an inner surface of a facing one of the peripheral walls.

31. The collapsible cold-insulating container of claim 30,
including a cold-storage agent holder for holding the cold-storage
agent therein on an inner surface of at least one of the lids, peripheral
5 walls, bottom faces, and the inner cover.

32. The collapsible cold-insulating container of any one of claims
17 through 31,

wherein, in each of the two lids and the two bottom faces, a
10 length from the lid to the facing bottom face thereof and a length from
the bottom face to the facing lid thereof are smaller than a height of
the peripheral walls.

33. The collapsible cold-insulating container of any one of claims
15 16 through 32, including a protective case for housing the collapsible
cold-insulating container,

wherein the protective case is capable of housing the collapsible
cold-insulating container formed into a box configuration in use, and
housing a plurality of collapsible cold-insulating containers in a
20 collapsed configuration not in use.